

**EPA Superfund  
Record of Decision:**

**ELLSWORTH AIR FORCE BASE  
EPA ID: SD2571924644  
OU 07  
ELLSWORTH AFB, SD  
06/07/1996**

FINAL

Record of Decision for  
Remedial Action at Operable Unit 7  
Ellsworth Air Force Base, South Dakota

United States Air Force  
Air Combat Command  
Ellsworth Air Force Base  
Project No.: FXBM947002

June 1996

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## 1. DECLARATION FOR THE RECORD OR DECISION

### 1.1 SITE NAME AND LOCATION

Operable Unit 7 (OU-7), Weapons Storage Area, Ellsworth Air Force Base (EAFB),  
National Priority List Site  
Meade and Pennington Counties, South Dakota

### 1.2 STATEMENT OF BASIS AND PURPOSE

This decision document describes EAFB's selected remedial action for Operable Unit 7 (OU-7), in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision is based on the contents of the Administrative Record for OU-7, EAFB. The U.S. Environmental Protection Agency (EPA) and the South Dakota Department of Environment and Natural Resources (SDDENR) concur with the selected remedial action.

### 1.4 DESCRIPTION OF SELECTED REMEDY

Twelve potentially contaminate areas, or operable units, have been identified at EAFB. This ROD is for a remedial action at OU-7 and is the 10th ROD for EAFB.

The selected alternative for soils, institutional controls, includes the following major components:

- Institutional controls for future land use;
- An extensive records search will be performed that may provide additional information relating to the burial trenches. A removal action might be used to address waste within the trenches if the weight of evidence from this records search combined with previous information identifies and warrants this type of remedial activity.

The selected alternative for ground water, institutional controls with additional monitoring, includes the following major components;

- Institutional controls for ground water use;
- Implementing a long-term ground-water monitoring and maintenance program.

Implementation of the remedy will reduce the future risk to human health and the environment to acceptable levels.

### 1.5 STATUTORY DETERMINATION

The selected remedy is protective of human health and the environment, complies with Federal and State of South Dakota requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions to the maximum extent practicable for OU-7. However, because treatment of the principal threats of the OU was not found to be necessary or cost effective, this remedy does not satisfy the statutory preference for treatment as a principal element. The fact that there are no apparent on-site hot spots or plumes that represent major sources of contamination preclude a remedy in which contaminants could be treated effectively.

Because this remedy will result in hazardous substances remaining on site within the soil and ground water at low levels, a review will be conducted no less often than every five years after signing of the ROD to ensure that the remedy continues to provide adequate protection of human health and the environment.

### 1.6 SIGNATURE AND AGENCY CONCURRENCE ON THE REMEDY

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<IMG SRC 0896123A>  
<IMG SRC 0896123B>

## **2. DECISION SUMMARY**

### **2.1 SITE NAME AND LOCATION**

EAFB is U.S. Air Force (USAF) Air Combat Command (ACC) installation located 12 miles east of Rapid City, South Dakota, and adjacent to the small community of Box Elder (Figure 2-1).

EAFB covers approximately 4,858 acres within Meade and Pennington Counties and includes runways and airfield operations, industrial areas, housing and recreational facilities (Figure 2-2). Open land, containing a few private residences, lies adjacent to EAFB on the north, south, and west, while residential and commercial areas lie to the east of the Base.

### **2.2 OPERABLE UNIT 7 (OU-7) DESCRIPTION/HISTORY AND REGULATORY OVERSIGHT ACTIVITIES**

#### **2.2.1 Description/History**

EAFB was officially activated in July 1942 as the Rapid City Army Air Base, a training facility for B-17 bomber crews. It became a permanent facility in 1948 with the 28th Strategic Reconnaissance Wing as its host unit. Historically, EAFB has been the headquarters of operations for a variety of aircraft, as well as the Titan I Intercontinental Ballistic Missile and the Minuteman I and Minuteman II missile systems. The Air Force has provided support, training maintenance, and/or testing facilities. Presently, the 28th Bombardment Wing (B-1B bombers) and the 99th Tactics and Training Wing are the host units of EAFB.

OU-7, 1 of 12 contamination study areas (Figure 2-2), includes the Low-Level Radioactive Waste Burial (LLRWB) site located in the Weapons Storage Area (WSA) at the northern end of the Base. The WSA covers approximately 65 acres and is currently active. The complex included two storage buildings, several storage igloos, two waste burial pit areas, five wastewater underground storage tanks (USTs), and 16 heating fuel USTs (Figure 2-3). The wastewater USTs were used to store water from the wash-down and cleaning of nuclear weapons that drained through the floor drains into the USTs.

Radioactive wastes were generated at EAFB between 1952 and 1962. The five wastewater USTs and 16 heating fuel USTs were removed in 1993 as part of a Base tank removal program. Although historical records indicate that there were two waste burial pits, the exact locations are not known. No available information has indicated that any ordnance or explosive radioactive wastes were disposed of at OU-7. However, it is possible that the disposal areas might contain this type of material.

The topography at OU-7 gently slopes toward the west and southwest away from the high plateau located in the northeastern corner of the WSA. Surface-water drainage from OU-7 generally flows into drainages directed to Boxelder Creek. Some surface water flows off Base to the east, northeast, and southeast of the OU.

OU-7 surface geology generally consists of a surface layer of silty clay, approximately 3 to 6 feet thick, underlain by a layer of silty sandy gravel to clayey gravel, 4 to 27 feet thick. These layers overlie the Pierre Shale Formation. Depth to shallow ground water at OU-7 ranges from approximately 10 to 31 feet.

The shallow aquifer at EAFB is considered a potential drinking water source and possibly discharges to the surface. The ground water is classified as having a beneficial use as a drinking water supply suitable for human consumption (S.D. Chapter 74:03:15, Ground-Water Quality Standards).

Deeper bedrock aquifers also exist beneath EAFB. These deeper aquifers are separated from the shallow aquifer by 800 feet of impermeable clays and silts. In the past, EAFB utilized these deeper aquifers for its water supply. Presently, EAFB obtains its potable water from the Rapid City Municipal Distribution System.

The petroleum-contaminated soil from the fuel oil UST near Building 88316 is underneath the building's structure and is being addressed under a State-directed UST investigation. Therefore, the alternatives addressed in the FS do not need to meet SDDENR criteria for petroleum-contaminated soil (SD 74:03:32).

#### **2.2.2 Regulatory Oversight Activities**

Environmental investigation activities at EAFB were initiated by the Air Force in 1985 through an Installation Restoration Program (IRP) Phase I Installation Assessment/Records Search and Phase II Confirmation/Quantification. The Phase I study, dated September 1985, identified a total of 17 locations at EAFB where releases involving hazardous substances potentially occurred.

In Phase II of the IRP investigation, field activities included soil vapor surveys, geophysical surveys, surface and subsurface soil sampling, ground-water sampling, ground-water hydrologic testing, and ecological investigations.

On August 30, 1990 (55 Federal Register 35509), EAFB was listed on the EPA's National Priority List (NPL). A Federal Facilities Agreement (FFA) was signed in January 1992 by USAF, EPA, and the State of South Dakota (State) and went into effect on April 1, 1992. The FFA establishes a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions for EAFB in accordance with CERCLA, as amended by SARA, and the NCP. It also states the oversight procedures for EPA and the State to ensure USAF compliance with the specific requirements. The FFA identified 11 potential source-area operable units as well as a Base-wide ground-water operable unit.

Listing on the NPL and execution of the FFA required the USAF to perform a remedial investigation/feasibility study (RI/FS) to investigate the 12 operable units. In 1993 and 1994, an extensive RI field program was conducted to characterize conditions at OU-7. The program included a surface geophysical survey, a surface radiological survey, completion of 16 soil boreholes, installation of two ground-water monitoring wells, soil sampling of five wastewater UST excavations, assessment of human health risks, and review and compilation of previous IRP investigations. Collection and laboratory analysis of soil, ground-water, surface-water, and sediment samples were included in the RI field program.

### 2.3 HIGHLIGHTS OF COMMUNITY PARTICIPATION

Community relations activities that have taken place at EAFB to date include:

- FFA process. After preparation of the FFA by the USAF, EPA, and SDDENR, the document was published for comment. The FFA became effective April 1, 1992.
- Administrative Record. An Administrative Record for information was established in Building 8203 at EAFB. The Administrative Record contains information used to support USAF decision making. All the documents in the Administrative Record are available to the public.
- Information repositories. An Administrative Record outline is located at the Rapid City Library (public repository).
- Community Relations Plan (CRP). The CRP was prepared and has been accepted by EPA and the State of South Dakota and is currently being carried out. An update to this plan will be prepared in 1996.
- Restoration Advisory Board (RAB). The RAB has been formed to facilitate public input in the cleanup and meets quarterly. In addition to USAF, EPA, and South Dakota oversight personnel, the RAB includes community leaders and representatives from the surrounding area.
- Mailing list. A mailing list of all interested parties in the community is maintained by EAFB and updated regularly.
- Fact sheet. A fact sheet describing the status of the IRP at EAFB was distributed to the mailing list addressees in 1992.
- Open house. An informational meeting on the status of the IRP and other environmental efforts at EAFB was held on May 6, 1993. This type of open house meeting format was also used during the November 16, 1995 Restoration Advisory Board meeting to present information.
- Newspaper articles. Articles have been written for the Base newspaper regarding IRP activity.
- Proposed Plan. The proposed plan on this action was distributed to the mailing list addressees for their comments.

A public comment period was held from December 28, 1995 to January 27, 1996, and a public meeting was held on January 11, 1996. At this meeting, representatives from EAFB answered questions about the remedial action. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this ROD.

This ROD is based on the contents of the Administrative Record for OU-7, in accordance with CERCLA, as amended by SARA, and the NCP. The RI/FS reports and the Proposed Plan for OU-7 provide information about OU-7 and the selected remedy. These documents are available at the Information Repositories at EAFB and the Rapid City Public Library.

## 2.4 SCOPE AND ROLE OF RESPONSE ACTION

The FFA identified 11 potential source area operable units (OUs) as well as a Base-wide ground-water operable unit. The 12 operable units are identified as follows:

OU-1	Fire Protection Training Area
OU-2	Landfill Nos. 1 and 6
OU-3	Landfill No. 2
OU-4	Landfill No. 3
OU-5	Landfill No. 4
OU-6	Landfill No. 5
OU-7	Weapons Storage Area
OU-8	Explosive Ordnance Disposal Area (Pramitol Spill)
OU-9	Old Auto Hobby Shop Area
OU-10	North Hangar Complex
OU-11	Base-wide Ground Water
OU-12	Hardfill No. 1

This ROD documents the selected remedy for the preferred remedial action (RA) at OU-7 and is the 10th ROD for EAFB. The remedial action objectives (RAOs) are to reduce the potential risks posed by contaminants in soils and to prevent ingestion of ground water containing chemicals that are risk drivers at concentrations exceeding maximum contaminant levels (MCLs).

A focused approach has been applied to the development of the remedial alternatives. The alternatives that were developed focused on remedy components most important for attaining the remedial objectives. While there is some risk associated with the contamination observed at the OU, it is apparent that the levels are not indicative of a major source or release of contamination. The known sources of contamination have been removed and mitigated (i.e., wastewater and fuel-oil USTs have been removed). Other contaminated media that are not directly associated with a known release or known contamination source have been identified. The reported disposal trenches with low-level radiological waste have not been located. Therefore, when examining source area remedial action options for soil, emphasis was placed on evaluating different methods of eliminating exposure routes by containing or removing the contaminated media or controlling the area's activities. During examination of ground-water control alternatives, emphasis was placed on evaluating different methods for monitoring water quality and control and removal of contaminants in ground water.

An extensive records search will be performed that may provide information relating to the burial trenches and, if necessary, remediation will be performed as a removal action.

## 2.5 SITE CHARACTERISTICS

This section describes the presence and distribution of contaminants at OU-7 as a result of past activities. Inorganic and radionuclide concentrations in soils and sediment were compared to estimated background concentrations. If detected, organic compounds are discussed in this section. For surface water and ground water, some applicable or relevant and appropriate requirements (ARARs) do exist for all types of analytes. Therefore, in addition to detected organics and comparison of inorganics and radionuclides to background levels, exceedances of ARARs are discussed. All ARARs and estimated background concentrations are presented in detail in the FS report.

An electromagnetic (EM) survey and a radioactivity screening survey were performed to determine the locations of the waste burial sites. However, the results of these surveys did not reveal definitive anomalies that were indicative of the exact locations of the buried trenches. Based on findings from a subsequent radiological investigation for OUs 2 and 7 performed in May 1995, an anomaly was noted south of Building 88304. The report indicated that the observed radiation levels could be due to normal variations in background levels, construction materials buried in the area, or buried radioactive waste.

### 2.5.1 Surface Soils

#### 2.5.1.1 Volatile Organic Compounds (VOCs)

Three VOCs were reported in surface soil samples for OU-7. Methylene chloride was reported in 3 of 20 samples with a maximum concentration of 38 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ); toluene was reported in 7 of 20 samples with a maximum concentration of 20 ( $\mu\text{g}/\text{kg}$ ); and octamethyltetra-cyclosiloxane (OMTCS), a tentatively identified compound (TIC), was reported in 16 of 20 samples with a maximum concentration of 780  $\mu\text{g}/\text{kg}$ . OMTCS is a laboratory contaminant. No specific pattern of VOC contamination exists in the surface soil.

#### 2.5.1.2 Inorganic Analytes

Thallium was the inorganic analyte most frequently found above background levels, with a maximum concentration of 0.41 milligrams per kilogram (mg/kg). The elevated concentrations of thallium were reported in samples collected near the monitoring wells and near the UST disposal lines. Lead and manganese were also reported above background levels with maximum concentrations of 56.8 mg/kg and 5,570 mg/kg, respectively.

#### 2.5.1.3 Radioactive Analytes

Although radionuclides were sometimes detected in surface soils, the concentrations at OU-7 are at this time considered to be within the normal background range due to natural variations in soil types and geological characteristics,. The original gross alpha background concentrations used for comparison of surface soils range from 8.17 pCi/g to 14.49 pCi/g. To verify this assumption, a long-term background radiological investigation is ongoing, and the results of this investigation may affect the evaluation of soil at the OU.

### **2.5.2 Subsurface Soils**

#### 2.5.2.1 Volatile Organic Compounds

Three VOCs were reported in the soil boring subsurface samples at OU-7. Methylene chloride was reported in 3 of 18 samples with a maximum concentration of 24 µg/kg, toluene was reported in 9 of 18 samples with a maximum concentration of 7 µg/kg, and OMTCS was reported as a TIC in 11 of 18 samples with a maximum concentration of 730 µg/kg.

#### 2.5.2.2 Inorganic Analytes

Thallium and manganese were the inorganics found most frequently above background (8 of 10 samples and 10 of 18 samples with maximum concentrations of 0.36 mg/kg and 7,900 mg/kg, respectively). Arsenic was reported above background in 8 of 18 soil boring subsurface samples with a maximum concentration of 146 mg/kg.

#### 2.5.2.3 Radioactive Analytes

Although radionuclides were detected in subsurface soils, the concentrations at OU-7 are at this time considered to be within the normal background range due to natural variations in soil types and geological characteristics. The original gross alpha background concentrations used for comparison of subsurface soils range from 12.28 picocuries per gram (pCi/g) to 18.16 pCi/g. To verify this assumption, a long-term background radiological investigation is ongoing, and the results of this investigation may affect the evaluation of soil at the OU.

### **2.5.3 UST Pit Soils**

#### 2.5.3.1 Volatile Organic Compounds

Two VOC analytes were reported above detection limits in UST pit soil samples at OU-7. Methylene chloride was detected in 4 of 11 samples with a maximum concentration of 11 µg/kg. The and OMCTS was detected in 6 of 11 samples with a maximum concentration of 210 µh/kg. The heating fuel UST investigation conducted separately indicates the presence of benzene, toluene, ethylbenzene, and xylene (BTEX) compounds in soils located near the USTs.

#### 2.5.3.2 Semivolatile Organic Compounds (SVOCs)

Ten SVOCs were reported in UST pit soil samples above detection limits. DI-n-butylphthalate was reported in all 11 samples with a maximum concentration of 1,800 µg/kg, fluoranthene and prometon were reported in 3 of 11 samples with maximum concentrations of 58 µg/kg and 310 µg/kg, respectively, and pyrene was reported in 2 of 11 samples with a maximum concentration of 48 µg/kg. No specific pattern of SVOC contamination exists in the UST pit soils.

#### 2.5.3.3 Inorganic Analytes

Six inorganic analytes were reported above the background range in UST pit soils, including seven exceedances for manganese with a maximum concentration of 4,170 mg/kg. The remaining analytes that exceeded background were arsenic with a maximum concentration of 24.8 mg/kg, barium with a maximum concentration of 623 mg/kg, calcium with a maximum concentration of 86,500 mg/kg, vanadium with a maximum



concentration of 51.8 mg/kg, and thallium with a maximum concentration of 0.3 mg/kg.

#### 2.5.3.4 Radioactive Analytes

Although radionuclides were detected in UST pit soils, the concentrations at OU-7 are at this time considered to be within the normal background range due to natural variations in soil types and geological characteristics. To verify this assumption, a long-term background radiological investigation is ongoing, and the results of this investigation may affect the evaluation of soil at the OU.

### **2.5.4 Sediment**

#### 2.5.4.1 Volatile Organic Compounds

Three VOCs were detected in sediment samples at OU-7. Chloroform was found at all three sampling locations with a maximum concentration of 36 µg/kg, methane at two locations with a maximum concentration of 250 µg/kg, and carbon disulfide at one location with a maximum concentration of 79 µg/kg.

#### 2.5.4.2 Inorganic Analytes

Several inorganic analytes were detected in sediment samples, and most exceed the background levels for total soils. The maximum concentrations are as follows: aluminum - 30,800 mg/kg; barium - 515 mg/kg; beryllium - 1.9 mg/kg; calcium - 349,000 mg/kg; total chromium - 39.7 mg/kg; copper - 54.8; lead - 90.8 mg/kg; magnesium -17,000 mg/kg; manganese - 3,320 mg/kg; nickel - 65.9 mg/kg; potassium - 7,730 mg/kg; sodium - 3,590; vanadium - 92.6 mg/kg; zinc - 436 mg/kg; selenium - 2.1 mg/kg; and thallium - 0.86 mg/kg/kg. Total soil background levels were used for comparison because background concentrations for inorganics in sediment have not been estimated.

#### 2.5.4.3 Radioactive Analytes

Gross alpha, gross beta, and gamma emitters were detected in sediment samples with maximum concentrations of 12.6+3 pCi/g, 25+5 pCi/g, and 0.86+0.167 pCi/g, respectively, but were below the background concentrations for total soils. Total soil background levels were used for comparison because background concentrations for radionuclides in sediment have not been estimated. A long-term background radiological investigation is ongoing, and the results of this investigation may affect the evaluation of sediment at the OU.

### **2.5.5 Surface Water**

#### 2.5.5.1 Volatile Organic Compounds

Two surface-water samples were collected from the ephemeral pond at OU-7. Chloromethane was the only VOC detected in both samples with a maximum concentration of 6 µg/L. There are no ARARs for chloromethane in surface water.

#### 2.5.5.2 Inorganic Analytes

Several inorganics were detected in the surface-water samples and were compared to ARARs (State ambient water quality criteria). The maximum concentration for arsenic was 3.2 micrograms per liter (µg/L). The RI report compares the detected arsenic concentrations to a water quality standard of 0.0022 µg/L. However, the reported standard in the RI is for human consumption of fish and would apply only if the water body had a beneficial use classification for recreation including fishing. Although the pond is not classified or used as a drinking water supply, the MCL for arsenic (50 µg/L) is more stringent than the Federal freshwater acute and chronic criteria (360 µg/l and 190µg/L, respectively) and can be used as the ARAR. The detected arsenic concentrations are well below the MCL for arsenic. For all other constituents that have ARARs, the ARARs were not exceeded.

#### 2.5.5.3 Radioactive Analytes

Gross alpha, gross beta, and gamma emitters were also detected in the surface-water samples with maximum concentrations of 3.2+0.6 pCi/g, 12+2 pCi/g, and 2.93+7.53 pCi/g, respectively, and were compared to ARARs. The concentrations of radioactive analytes are below the standards. A long-term background radiological investigation is ongoing, and the results of this investigation may affect the evaluation of surface water at the OU.

## **2.5.6 Ground Water**

### **2.5.6.1 Volatile Organic Compounds**

Two monitoring wells were installed at OU-7 in 1993, and three ground-water samples were collected (one from each of the newly installed wells and one from an existing upgradient well). The only VOCs detected were chloromethane and trichloroethylene (TCE). Chloromethane was reported in all three samples with a maximum concentration of 0.8 µg/L, but the ARAR (MCL) for chloromethane was not exceeded. TCE was reported at a maximum concentration of 9 µg/L, exceeding the National Primary Drinking Water Regulations (NPDWR) standard (or MCL) and State Ground Water Quality Standard of 5 µg/L. In addition, ground-water sampling performed as part of the OU-11 sitewide ground-water investigation at OU-7 to determine the extent of the reported TCE contamination also detected TCE in well MW930702 exceeding the MCL at a concentration of 32 µg/L. However, additional field screening ground-water samples collected nearby found no detections, indicating that a plume does not exist.

### **2.5.6.2 Inorganic Analytes**

Twelve inorganic analytes were detected by total analysis, and 12 analytes were detected in the dissolved phase. Dissolved antimony slightly exceeded the NPDWR standard for one sample and MCL goal (MCLG) for all three samples, with a maximum concentration of 6 µg/L. However, the detected antimony concentrations were below the background levels. No other ARARs for inorganics were exceeded, including State Ground Water Quality Standards. Antimony is among several inorganics believed to occur naturally at elevated levels in the area.

### **2.5.6.3 Radioactive Analytes**

Gross alpha, gross beta, and gamma emitters were detected in the ground-water samples with maximum concentrations of 26+5 pCi/g, 17+3 pCi/g, and 4.94+6.77 pCi/g, respectively, and were compared to ARARs. The concentrations of gross beta and gamma emitters were below the standards. Gross alpha concentrations exceeded the standard for two of the samples. However, none of the radionuclides detected in ground water were above the background concentrations. The gross alpha and gross beta background concentrations exceed the federal MCLs, while gross alpha levels exceeded the State Ground Water Quality Standards. A long-term background radiological investigation is ongoing. Any reevaluation of the groundwater based on the results of this investigation will occur as part of OU-11.

## **2.6 SITE RISK SUMMARY**

### **2.6.1 Human Health Risks**

The selected alternative discussed in Section 2.9 will address the human health and ecological risks presented in this section.

The assessment of human health risks for this OU considered the following topics:

- (1) Contaminants of concern (COCs) in ground-water, surface-water, sediment, and soil samples collected at OU-7;
- (2) Current and future land-use conditions;
- (3) Potential environmental pathways by which populations might be exposed;
- (4) Estimated exposure point concentrations of chemical and radionuclide COCs;
- (5) Estimated intake levels of the COCs;
- (6) Toxicity of the COCs; and
- (7) Uncertainties in the assessments of exposure, toxicity, and general risks.

Noncarcinogenic and carcinogenic risks were calculated for the following potential exposure groups:

- (1) Current EAFB maintenance personnel mowing grass on-site who ingest and have dermal contact with surface soil;
- (2) The future adult/child living on-site who ingests surface soil;

- (3) The future adult/child living on-site who has dermal contact with surface soil and ingests and showers with shallow ground water;
- (4) The future adult/child living on-site who ingests surface water and sediment, has dermal contact with surface water, and inhales volatile contaminants; and
- (5) Future adult construction workers who excavate on-site for building residences who ingest soil, inhale particulates, and inhale volatile contaminants.

A quantitative risk assessment was performed for the ground water, soil, sediment, and surface water. The risk assessment evaluated potential effects on human health posed by exposure to contaminants within OU-7. Carcinogenic risks were estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to a potential cancer-causing chemical. The acceptable risk range expressed as a probability is one cancer incident in ten thousand people to one cancer incident in a million people. This level of risk is also denoted by  $1 \times 10^{-6}$ . Risks within the acceptable risk range may or may not warrant remedial action depending on site-specific circumstances. Risks below this range cannot be differentiated from the background occurrence of cancer in human populations. Risks calculated in a risk assessment are potential risks and are excess (i.e., over background) cancer risks due to exposure from contaminants at the OU. Noncarcinogenic health risks are evaluated using the hazard index (HI). If the HI is less than or equal to one, the contaminant concentration is considered an acceptable level and it is generally assumed that the human population may be exposed to it during a 30-year period without adverse health effects.

Some surface soil samples had concentrations of gross alpha and gross beta radioactivity exceeding the soil background range. However, the risks associated with ingestion and inhalation of, and dermal contact with, these contaminants by potential future residents and construction workers are very small and within the acceptable range ( $1 \times 10^{-4}$  to  $1 \times 10^{-6}$  or less). Risks associated with construction worker exposure to gross alpha and gross beta and several inorganic analyte (especially manganese) contaminants in UST pit soils are also minimal and within the acceptable range. Although VOCs, inorganics, and radionuclides were detected in sediment, the risk to potential future residents and construction workers from ingestion, inhalation, and/or dermal contact are within the acceptable range. There are no unacceptable risks to potential future residents and construction workers from ingestion and inhalation of, or dermal contact with, contaminants in surface water or ground water. Based on the minimal risks associated with contaminants in soils and ground water at the site, limited institutional controls for these media are warranted.

## **2.6.2 Ecological Risks**

An ecological risk evaluation of OU-7 was based on a combination of data and literature reviews, field and laboratory analyses, analyte evaluation and screening, and preliminary risk screening. Results of the evaluation indicate that OU-7 does not exhibit significant ecological value due to its highly disturbed environment (OU-7 primarily consists of buildings, roads, and paved areas). There are small areas of potential grassland and wetland habitats at the OU. A variety of animal species may live, forage, or nest in OU-7 habitats. These species include various types of invertebrates, amphibians, birds, and mammals. Terrestrial vegetation and soil faunal communities do not reveal characteristics that indicate chemical-related impacts. This finding is consistent with the relatively low levels of contaminants in the soil. Because of the altered natural environment at OU-7, rare, threatened, or endangered species are unlikely to utilize the area for more than brief, periodic habitat. Due to the low levels of contaminant concentrations, the contaminants do not pose an unacceptable risk to these species. In addition, the limited contact these species would have with OU-7 area ensures unacceptable risk to a single individual will not occur.

Because of these considerations, an OU-specific ecological investigation and risk assessment was not recommended or performed at OU-7. However, a Base-wide ecological risk assessment was conducted as part of OU-11, and OU-7 has been included in this Base-wide evaluation. A complete list of species that may visit the OU, and the Base-wide ecological risk assessment, is presented in the Final Remedial Investigation Report, Operable Unit 11, Ellsworth Air Force Base, South Dakota (USAF, 1995).

## **2.7 DESCRIPTION OF ALTERNATIVES**

Using a focused approach to develop the remedial alternatives for OU-7, emphasis was placed on eliminating or reducing exposures to contaminants in soil and ground water by containing or removing the contaminated media or controlling the site's activities. The alternatives that were developed were separated into those addressing soil and those addressing ground water:

#### **Alternative 1 (Soil) - No Action**

- No action.
- The no action alternative represents the baseline condition at OU-7 and refers to taking no further action for the soil.

#### **Alternative 2 (Soil) - Institutional Controls**

- Institutional controls for future land use;
- An extensive records search will be performed that may provide additional information relating to the burial trenches. A removal action might be used to address waste within the trenches if the weight of evidence from this records search combined with previous information identifies and warrants this type of remedial activity.

#### **Alternative 3a (Soil) - Wastewater UST Soil Removal and Disposal at OU-4**

- Potentially contaminated soil would be delineated and excavated from the former wastewater UST locations.
- The UST piping and potentially contaminated soil surrounding the piping would be excavated.
- Removal of soil would consider contaminant levels based on risks associated with manganese and radionuclides in soil.
- The excavated soil and miscellaneous debris would be disposed of at the on-Base OU-4 landfill or could be hauled to the nearest RCRA landfill facility.

#### **Alternative 3b(Soil) - Waste Disposal Trenches Soil Removal and Disposal at OU-4**

- Potentially contaminated soil would be delineated and excavated from the suspected waste disposal trench locations.
- Removal of soil would consider contaminant levels based on risks associated with manganese and radionuclides in soil.
- The excavated soil and miscellaneous debris would be disposed of at the on-Base OU-4 landfill or could be hauled to the nearest RCRA landfill facility.

#### **Alternative 4 (Ground Water) - No Action**

- No action.
- The no action alternative represents the baseline condition at OU-7 and refers to taking no further action for the ground water at OU-7.

#### **Alternative 5 (Ground Water) - Institutional Controls with Additional Monitoring**

- Institutional controls for ground water use;
- Implementing a long-term ground-water monitoring and maintenance program.

#### **Alternative 6a (Ground Water) - Ground-Water Extraction Well/On-Base Wastewater Treatment Plant/Discharge to Surface Water**

- Install a ground-water extraction well (pump) at MW930702 near the northeast corner of the OU-7 boundary.
- Install piping to convey extracted ground water to the nearest sanitary wastewater treatment
- Treat extracted ground water at the existing on-Base sanitary wastewater treatment plant for an estimated 5 years, and perform ground-water monitoring for an estimated 30 years.
- Discharge treated ground water to the surface water drainage below the treatment plant.

**Alternative 6b (Ground Water) - Ground-Water Recovery Trench/On-Base Wastewater Treatment Plant/Discharge to Surface Water**

- Install extraction trench near well MW930702 near the northeast corner of the OU-7 boundary.
- Install piping to convey extracted ground water to the nearest sanitary sewer line.
- Treat extracted ground water at the existing on-Base sanitary wastewater treatment plant for an estimated 5 years, and perform ground-water monitoring for an estimated 30 years.
- Discharge treated ground water to the surface water drainage below the treatment plant.

**Alternative 6c (Ground Water) - Extraction Well/On-Site Treatment Plant/Discharge to On-Base Wastewater Treatment Plant**

- Install a ground-water extraction well (pump) at MW930702 as stated in alternative 6a.
- Treat extracted ground water at an on-site portable carbon adsorption unit for an estimated 5 years, and perform ground-water monitoring for an estimated 30 years.
- Discharge treated ground water to the nearest sanitary sewer line and the on-Base wastewater treatment plant.

**2.8 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES**

The analysis of alternatives provides a narrower range of feasible remedial actions at OU-7. The remedial action objectives (RAOs) for the site are as follows;

**Soil**

- Reduce construction worker inhalation of surface and subsurface soil contaminants at concentrations exceeding remediation goals.

**Ground Water**

- Prevent ingestion of ground water containing contaminants at concentrations exceeding the remediation goals.

The area of attainment for ground water is defined as the area that will achieve the RAOs after remediation is completed. Ground water within the boundaries of OU-7 may be considered an area of attainment.

Pursuant to Section 300.430(e)(9)(iii) of the revised NCP, the remedial action to be implemented should be selected based on consideration of nine evaluation criteria. These criteria are as follows:

1. Overall protection of human health and environment.
2. Compliance with ARARs.
3. Long-term effectiveness and permanence.
4. Reduction of toxicity, mobility, or volume of contamination.
5. Short-term effectiveness.
6. Implementability.
7. Cost.
8. State acceptance.
9. Community acceptance.

The following sections provide a brief review and comparison of the remedial alternatives according to the NCP evaluation criteria.

**2.8.1 Overall Protection of Human Health and the Environment**

The assessment of this criterion considers how the alternatives achieve and maintain protection of human health and the environment.

Alternatives 1 and 4 (no action alternatives for soil and ground water, respectively) do nothing to reduce risk levels at OU-7. Alternatives 2 and 5 (institutional controls for soil and ground water,

respectively) reduce risk of exposures to soil and ground water by restricting site access and restricting land use to eliminate primary receptor populations under future land use scenarios. Alternative 5 also provides for additional monitoring to detect potential future contaminant releases to ground water. Alternatives 3a and 3b eliminate potential exposure associated with surface and subsurface soils and minimize the risk of the soil contributing contaminants to ground water. Alternatives 6a, 6b, and 6c include remediation of the ground water to meet ARARs.

## **2.8.2 Compliance with ARARs**

Alternatives are assessed under this criterion in terms of compliance with ARARs. Applicable requirements include cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstances at a CERCLA site.

Relevant and appropriate requirements address problems or situations sufficiently similar to those encountered at a CERCLA site that their use is well suited to the environmental and technical factors at a particular site. ARARs are grouped into the following three categories:

- Chemical-Specific ARARs are health or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in establishment of the amount or concentration that may be found in, or discharged to, the environment.
- Location-Specific ARARs restrict the concentration of hazardous substances or the conduct of activities solely because they are in specific locations such as flood plains, wetlands, historic places, and sensitive ecosystems or habitats.
- Action-Specific ARARs are usually technology- or activity-based requirements or limitations on actions taken with respect to hazardous wastes.

A summary evaluation of Federal and State ARARs pertinent to this remedial action is provided in Table 2-1 at the end of Section 2.0. A narrative discussion of compliance with ARARs is provided below for the alternatives considered.

### Alternatives 1 and 4 (No action for Soil and Ground Water):

Alternative 4 does not achieve ground-water ARARs, and alternatives 1 and 4 do not meet the RAOs for OU-7. No action would be taken to prevent human contact with surface-soil and ground-water contaminants. No Federal or State permits are required for these alternatives.

### Alternative 2 (Institutional Controls for Soil):

Alternative 2 will not achieve ARARs because no ARARs exist for soils. However, it would reduce potential exposure and subsequent risks associated with the soils at the OU by effectively restricting site access and deterring unauthorized site entry. No Federal or state permits are required for this alternative.

### Alternative 5 (Institutional Controls for Ground Water):

Alternative 5 would reduce potential exposure and subsequent risks associated with ground water at the OU by effectively restricting site access, deterring unauthorized site entry, and eliminating ground-water consumption. Ground-water ARARs (MCLs) would not be met with this alternative through active remediation. However, natural attenuation is likely to reduce existing ground-water contamination levels below the MCL.

### Alternatives 3a and 3b (Wastewater UST and Waste Disposal Trenches Soil Removal and Disposal):

Alternatives 3a and 3b will not achieve ARARs because no ARARs exist for soils. However, they would achieve risk-based cleanup levels and reduce the potential of contaminants from the soil to migrate to ground water. Action-specific ARARs relating to the disposal of excavated soil at the OU-4 landfill would include corrective action management unit (CAMU) regulations. Land disposal restrictions (LDRs) would be the ARARs for the soil to be disposed of at an off-site facility.

#### Alternatives 6a, 6b, and 6c (Ground Water Extraction/Treatment):

Alternatives 6a, 6b, and 6c would meet ground-water ARARs by treating the extracted ground water to achieve MCLs. Sufficient ground water would be extracted and treated so that MCLs would be met at the Base boundary.

#### **2.8.3 Long-Term Effectiveness and Permanence**

The assessment of this criterion involves considering the long-term effectiveness of alternatives in maintaining protection of human health and the environment after RAOs have been met.

Alternatives 1 and 4 would not provide additional effectiveness or permanence in reducing the potential for direct contact or ingestion of the soil or ground water. No further controls for the OU would be developed under this alternative.

Alternatives 2 and 5 would provide for increased effectiveness of access restrictions (in addition to the general EAFB access restrictions), thereby reducing risk of exposure to contaminants. Permanency and reliability of these controls would be enhanced through long-term monitoring and maintenance of the OU. Uncertainties exist with regard to the ability to provide long-term access restrictions.

Alternatives 3a and 3b would provide the highest level of long-term effectiveness for soil. Reduction of risk would be achieved by the removal of the soil that is driving the human health risks associated with the soil. Unrestricted future land uses would be allowed.

Alternatives 6a, 6b, and 6c would offer a high level of long-term effectiveness for ground water. Minimization of risk would be achieved by a reduction in the concentration of chemicals in the ground water.

#### **2.8.4 Reduction of Toxicity, Mobility, and Volume through Treatment**

The assessment of this criterion involves considering the anticipated performance of specific treatment technologies that an alternative may employ.

Alternatives 1, 2, 4, and 5 would not provide for the reduction of toxicity, mobility, or volume of the chemicals of concern in the soil and/or ground water. Alternatives 3a and 3b do not use treatment technologies but reduce the mobility of the contaminants in soils by removal and disposal/containment at the OU-4 landfill. Alternatives 6a, 6b, and 6c reduce the toxicity, mobility, and volume of ground-water contaminants through extraction and treatment.

#### **2.8.5 Short-Term Effectiveness**

The assessment of this criterion considers the effectiveness of alternatives in maintaining protection of human health and the environment during the construction of a remedy until RAOs have been met.

The proposed alternatives are not expected to significantly impact worker or community health and safety during the implementation period. Alternatives 3a and 3b might impact community and worker health and safety somewhat through dust emissions during the initial construction phase. Alternative 3b could, to a small degree, impact worker and community health and safety via hazardous air emissions and/or human contact with hazardous waste during potential inadvertent radioactive waste intrusion. The impact could be minimized through dust mitigation and adequate health and safety precautions during implementation.

#### **2.8.6 Implementability**

The assessment of this criterion considers the administrative and technical feasibility of implementing the alternatives and the availability of necessary goods and services to fulfill the response action.

Alternatives 1 and 4 would not be difficult to implement because no further action would be undertaken.

Alternatives 2 and 5 require no special or unique activities and could be implemented using locally available materials and contractors. Long-term monitoring would indicate whether additional action is required in the future. Land use restrictions, annotations of base records and administrative controls can be implemented at EAFB by various administrative means.

Alternatives 3a and 3b could be implemented with standard construction equipment, materials, and methods. Alternative 3b could potentially require radioactive waste specialists and equipment to be on standby in case of inadvertent uncovering of radioactive waste materials.

Alternatives 6a, 6b, and 6c require no special or unique activities and could be implemented with widely available equipment, materials, and methods. For alternatives 6a and 6b, the existing on-Base wastewater treatment plant would be utilized to treat ground water. A single-pass trenching system would likely be employed for the alternative requiring a ground-water recovery trench, which is available from several vendors. The portable carbon adsorption treatment system that would be employed for Alternative 6c would be a small-volume unit and is also available from several vendors.

#### 2.8.7 Cost

The assessment of this criterion considers the capital and operation and maintenance (O&M) costs associated with each alternative. Alternatives are evaluated for cost in terms of both capital costs and long-term O&M costs necessary to ensure continued effectiveness of the alternatives. Capital costs include the sum of the direct capital costs (materials and labor) and indirect capital costs (engineering, licenses, permits). Long-term O&M costs include labor, materials, energy, equipment replacement, disposal, and sampling necessary to ensure the future effectiveness of the alternative. The objective of the cost analysis is to eliminate those alternatives that do not provide measurably greater protection of human health and the environment for additional costs that may be incurred.

The total costs for Alternative No. 2 do not include costs for the extensive records review relating to the burial trenches or any costs for the possible removal action. Costs have not been included for ground-water treatment at the on-Base sanitary wastewater treatment plant for Alternative Nos. 6a and 6b because these are included in (and would not significantly impact) the Base operational costs. However, costs associated with the on-site carbon adsorption ground-water treatment system have been included in Alternative 6c.

A summary of the costs for each alternative is as follows:

##### Alternative No. 1 (No Action - Soil)

Total Capital Costs	\$0
Total Annual (Sampling/Analysis/O&M) Costs	\$0
30-Year Present Value for Annual Costs	\$0
Annual Cost=\$0	
Years=30	
Discount Rates=5%	
TOTAL 30-Year Present Value	\$0

##### Alternative No. 2 (Institutional Controls - Soil)

Total Capital Costs	\$4,864
Total Annual (Sampling/Analysis/O&M) Costs	\$0
30-Year Present Value for Annual Costs	\$0
Annual Cost=\$0	
Years=30	
Discount Rates=5%	
TOTAL 30-Year Present Value	\$4,864

##### Alternative No.3a (Wastewater UST Soil Removal and Disposal at OU-4)

Total Capital Costs	\$418,430
Total Annual (Sampling/Analysis/O&M) Costs	\$0
30-Year Present Value for Annual Costs	\$0
Annual Cost=\$0	
Years=30	
Discount Rates=5%	
TOTAL 30-Year Present Value	\$418,430



Alternative No. 3b (Waste Disposal Trenches Soil Removal and Disposal at OU-4

Total Capital Costs	\$72,722
Total Annual (Sampling/Analysis/O&M) Costs	\$0
30-Year Present Value for Annual Costs	\$0
Annual Cost=\$0	
Years=30	
Discount Rates=5%	
TOTAL 30-Year Present Value	\$72,722

Alternative No. 4 (No Action-Ground Water)

Total Capital Costs	\$0
Total Annual (Sampling/Analysis/O&M) Costs	\$0
30-Year Present Value for Annual Costs	\$0
Annual Cost=\$0	
Years=30	
Discount Rates=5%	
TOTAL 30-Year Present Value	\$0

Alternative No. 5 (Institutional Controls with Additional Monitoring - Ground Water)

Total Capital Costs	\$42,980
Total Annual (Sampling/Analysis/O&M) Costs	\$60,000
30-Year Present Value for Annual Costs	\$922,320
Annual Cost=\$60,000	
Years=30	
Discount Rates=5%	
TOTAL 30-Year Present Value	\$965,300

Alternative No. 6a (Ground Water Extraction Well/On-Base Wastewater Treatment Plant/Discharge to Surface Water)

Total Capital Costs	\$121,500
Total Annual (Sampling/Analysis/O&M) Costs	\$60,000
30-Year Present Value for Annual Costs	\$922,320
Annual Cost=\$60,000	
Years=30	
Discount Rates=5%	
TOTAL 30-Year Present Value	\$1,043,820

Alternative No. 6b (Ground Water Recovery Trench/On-Base Wastewater Treatment Plant/Discharge to Surface Water)

Total Capital Costs	\$882,900
Total Annual (Sampling/Analysis/O&M) Costs	\$60,700
30-Year Present Value for Annual Costs	\$933,080
Annual Cost=\$60,700	
Years=30	
Discount Rates=5%	
TOTAL 30-Year Present Value	\$1,815,980

Alternative No. 6c (Ground-Water Extraction Well/On-Site Treatment Plant/Discharge to On-Base Wastewater Treatment Plant)

Total Capital Costs	\$84,200
Total Annual (Sampling/Analysis/O&M) Costs	\$61,100
30-Year Present Value for Annual Costs	\$939,290
Annual Cost=\$61,100	
Years=30	
Discount Rates=5%	
TOTAL 30-Year Present Value	\$1,023,490

#### **2.8.8 State Acceptance**

The assessment of this criterion considers the State's preference for or concerns about the alternatives.

The State concurs with the selected remedy. The State provided comments on the RI/FS, Proposed Plan, and this ROD. After incorporating adequate responses to the comments into the respective documents, the State concurred with the remedy.

#### **2.8.9 Community Acceptance**

Comments offered by the public were used to assess the community acceptance of the proposed alternative. The community expressed concerns about the selected remedy during the public comment period. The questions and concerns of the community are described in detail in the Responsiveness Summary, which is Appendix B of the ROD.

#### **2.9 SELECTED ALTERNATIVE**

Based on the requirements of CERCLA, comparative analysis of the nine criteria, public comments, and consultation with EPA and the State, the Air Force has determined that the selected alternative is a combination of Alternative 2, Institutional Controls for Soil and Alternative 5, Institutional Controls for Ground Water with Additional Monitoring. This alternative includes institutional controls in conjunction with comprehensive ground water monitoring and natural attenuation to evaluate and reduce potential future risk. Five-year reviews of the remedy will be required because potential contaminants will remain at OU-7 following completion of remedial action. Based on the results of this review ground water remediation may be necessary if contaminants increase or the plume moves.

The following major components comprise Alternative 2:

- Institutional controls for future land use;
- An extensive records search will be performed that may provide additional information relating to the burial trenches. A removal action might be used to address waste within the trenches if the weight of evidence from this records search combined with previous information identifies and warrants this type of remedial activity.

Alternative 5 includes the following major components;

- Institutional controls for ground water use;
- Implementing a long-term ground-water monitoring and maintenance program.

Institutional controls would be implemented to prevent human exposure to contaminated soil and ground water. These controls will include: (1) issuing a continuing order by the Installation Commander to restrict access to the site soils and to restrict or control temporary construction activities unless proper protective equipment is worn; (2) filing a notice with the State of South Dakota to recommend denial of water appropriation permit applications to install ground-water wells within the WSA boundary and any area which may be affected by contaminants; (3) annotation of base records in the event of property transfer.

A continuing order would be issued by the Installation Commander to restrict access to or disturbance of the soils and ground water as long as Ellsworth AFB owns the property. Specifically, it would;

- Restrict or place limitations on intrusive site activities, including the installation of any new underground utilities or other construction activities in the area of the WSA; thus preventing accidental exposures to construction workers.
- An existing fence would be maintained around the WSA as long as weapons storage remains the use of this area, and warning signs would be posted at the former UST locations and the waste disposal trench locations to deter unauthorized access.
- Provide for the use of proper protective equipment, in the event that intrusion through the site soils is required.

Continuing order requirements will be in effect as long as the property is owned by Ellsworth AFB. In the case of the sale or transfer of the property within OU-7 by the United States to any other person or entity, the Air Force will place covenants in the deed which will restrict access and prohibit disturbance of contaminated soils without approval of the United States. These covenants will be in effect until removed upon agreement of the State of South Dakota, the U.S. Environmental Protection Agency, and the U.S. Air Force or their successors in interest. The Air Force will also include in the deed the covenants required by section 120(h)(3) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), which include (1) a warranty that the United States will conduct any remedial action found to be required by law after the date of the transfer: (2) a right of access in behalf of EPA and the Air Force or their successors in interest to the property to participate in any response or corrective action that might be required after the date of transfer. The right of access referenced in the preceding sentence shall include the State of South Dakota for purposes of conducting or participating in any response or corrective action that might be required after the date of transfer.

These alternatives will meet the RAOs and reduce the potential risk at OU-7 by preventing future exposure to contaminants in the soils and ground water. The selected alternative will be protective of human health and the environment.

This alternative meets the statutory requirements of Section 121 of CERCLA as amended by SARA. These statutory requirements include protectiveness of human health and the environment, compliance with ARARs, cost effectiveness, and use of permanent solutions to the extent practicable. The statutory preference for treatment is not satisfied; however, the selected alternative reduces risk of impacts to human health and the environment.

## **2.10 STATUTORY DETERMINATIONS**

The selected remedy meets the statutory requirements of CERCLA as amended by SARA. These requirements include protection of human health and the environment, compliance with ARARs, cost effectiveness, and use of permanent solutions to the extent practicable. The selected remedy represents the best balance of tradeoffs among the alternatives considered.

The manner in which the selected remedy meets each of these requirements is described in the following sections.

### **2.10.1 Protection of Human Health and the Environment**

The selected remedy addresses health and environmental issues identified in the OU-7 RI report. Specifically, the institutional controls alternative for soil and ground water achieves the following goals:

- Eliminates exposure to soil and ground-water contaminants by implementing administrative actions that restrict site use and any intrusive activities.
- Prevents unauthorized access to the area by maintaining a perimeter fence and restricted access signs.

### **2.10.2 Compliance with ARARs**

Alternatives 2 and 5 will meet requirements to reduce risks associated with site soils and ground water to acceptable levels by providing access/development restrictions and controlling intrusive site activities. Additional information about ARAR compliance is contained in Section 2/8/2/

### **2.10.3 Cost Effectiveness**

The selected remedy provides overall effectiveness in reducing human health risks relative to its costs. The selected ground-water remedy provides the most cost-effective alternative for ground-water control.

### **2.10.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Extent Possible**

The institutional controls and 30-year ground-water monitoring will provide long-term prevention of exposure to contaminants in ground water.

A review of the selected remedy will be conducted every five years after signing of this ROD to ensure that the remedy continues to provide adequate protection of human health and the environment.

### **2.10.5 Preference for Treatment as a Principal Element**

Treatment of the soil and ground water at the OU is not supported based on findings of the RI for OU-7. No well-defined hot spots or contaminant plumes were present, and the risks associated with OU-7 can be addressed by eliminating exposure to the contaminants in soil and ground water by institutional controls.

## **2.11 DOCUMENTATION OF SIGNIFICANT CHANGES**

The selected action, institutional controls for site soils and ground water with additional monitoring of ground water, is somewhat different than the recommended alternative in the Proposed Plan and Feasibility Study for OU-7. The alternative originally selected was institutional controls for soils and ground water extraction/on-site treatment with a portable carbon adsorption unit, and discharge to the existing sanitary sewer line and on-Base wastewater treatment plant.

The primary reason for the change in the recommended alternative is that the FFA parties have recently agreed, and public comments have recommended, that institutional controls for very limited TCE contamination in ground water is the most cost-effective option. Natural attenuation of the TCE is also anticipated.

Table 2-1  
Evaluation of Federal and State ARARs that Might Apply to OU-7,  
Ellsworth Air Force Base, South Dakota

Standard Requirement, Criteria, or Limitation	Citations	Description	ARAR Type	Applicability to OU-7
A. Potentially Applicable or Relevant and Appropriate Federal Standard, Requirements, Criteria, Limitations				
Safe Drinking Water Act	42 USC 300g			
National Primary Drinking Water Standards	40 CFR Part 141	Establishes health-based standards for public water systems (maximum contaminant levels).	Chemical	Relevant and appropriate for Federal Class II aquifer.
National Secondary Drinking Water Standards	40 CFR Part 143	Establishes welfare-based standards for the public water systems (secondary maximum contaminant levels).	Chemical	Relevant and appropriate.
Maximum Contaminant Level Goals	Pub. L. N. 99-330, 100 Stat. 642 (1986)	Establishes drinking water quality goals set at levels of unknown or anticipated adverse health effects, with an adequate margin of safety.	Chemical	Relevant and appropriate.
Clean Water Act	33 USC 1251-1376			
Water Quality Criteria	40 CFR Part 131	Sets criteria for water quality based on toxicity to aquatic organisms and human health.	Chemical	Relevant and appropriate. Aquifer may be a Federal Class IIA (discharge to surface water).
Criteria and Standards for the National Pollutant Discharge Elimination System	40 CFR 125	Establishes criteria and standards for technology-based requirements in permits under the CWA.	Chemical	Applicable because of potential discharge stream or to wastewater treatment plant.
General Pretreatment Regulation for Existing and New Sources of Pollution	40 CFR 403	Establishes responsibilities of federal, state, and local government and of the POTW in providing guidelines for and developing, submitting, approving, and modifying state pretreatment programs. Specifies standards for pretreatment.	Action	Applicable because of potential discharge to EAFB wastewater treatment plant.
Guidelines Establishing Test Procedures for the Analysis of Pollutants	40 CFR 136	Specifies analytical procedures for NPDES applications and reports.	Action	Applicable because of treatment and discharge of ground water.
Clean Air Act				
National Primary and Secondary Ambient Air Quality Standard	40 CFR Part 50	Establishes standard for ambient air quality to protect public health and welfare.	Action	Applicable.
National Emission Standards for Hazardous Air Pollutants	40 CFR Part 61	Establishes regulatory standard for specific air pollutants.	Action	Applicable. Several alternatives would require discharge to the air following treatment.
Solid Waste Disposal Facility Criteria	40 CFR Parts 257 and 258	Sets forth revised minimum federal criteria for Municipal Solid Waste landfills (MSWLFs) for existing and new units.	Action	Relevant and appropriate for addressing landfill closure performance standards.
Land Disposal Restrictions	40 CFR Part 268	Identifies hazardous wastes that are restricted from land disposal and defines those limited circumstances under which a prohibited waste may continue to be land disposed.	Action	Relevant and appropriate. Alternatives may include the disposal of residual waste due to treatment.
Guidelines for the Land Disposal of Solid Waste	40 CFR Part 241	Establishes requirements and procedures for the disposal of solid waste.	Action	Relevant and appropriate for meeting landfill closure standards.

Table 2-1 (continued)  
Evaluation of Federal and State ARARs that Might Apply to OU-7,  
Ellsworth Air Force Base, South Dakota

Standard Requirement, Criteria, or Limitation	Citations	Description	ARAR Type	Applicability to OU-7
A.	Potentially Applicable or Relevant and Appropriate Federal Standards, Requirements, Criteria, and Limitations			
Resource Conservation and Recovery Act				
Hazardous Waste Management System: General	40 CFR Part 260	Establishes definitions, procedures, and criteria for modification or revocation of any provision in 40 CFR Parts 260-265.	Action	Applicable for identifying hazardous waste during soil removal, well placement, or trenching at OU-7.
Identification and Listing of Hazardous Wastes	40 CFR Part 261	Defines those solid wastes that are subject to regulations as hazardous waste under 40 CFR Parts 262-265.	Action	Applicable for identifying hazardous waste during soil removal, well placement, or trenching at OU-7.
Standards Applicable to Generators of Hazardous Wastes	40 CFR Part 262	Establishes standards for generators of hazardous waste.	Action	Applicable to alternatives relating to removal or off-site transport of a hazardous material.
Standards Applicable to Transporters of Hazardous Wastes	40 CFR Part 263	Establishes standards that apply to persons transporting hazardous waste within the U.S. if the transportation requires a manifest under 40 CFR Part 262.	Action	Applicable for any transport of hazardous materials off site.
Standards for Owners and Operators of Hazardous Waste TSDFs	40 CFR Part 264	Establishes standard for acceptable hazardous waste management.	Action	Relevant and appropriate for performance guidelines for landfill closure.
Standards for Owners and Operators of Hazardous Waste TSDFs with Interim Status	40 CFR Part 265	Establishes standards for acceptable hazardous waste management during interim status.	Action	Relevant and appropriate for performance guidelines for landfill closure.
Toxic Substances Control Act (TSCA)	40 CFR Part 761	Substances regulated under this rule include, but are not limited to, soils and other materials contained as a result of spills.	Action	Applicable.
Fish and Wildlife Coordination Act	16 USC 1531-666  40 CFR 6,302(g)	Requires consultation when a federal department or agency proposes or authorizes any modification of a stream or other water body and adequate provision for protection of fish and wildlife resources.	Action	Not an ARAR.
Endangered Species Act	16 USC 1531-1543  50 CFR Parts 17, 402  40 CFR 6.302(g)	Requires that federal agencies ensure that any action authorized, funded, or carried out by the agency is not likely to jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify critical habitat.	Location/Action	Not an ARAR. Ecological Assessment did not identify OU-7 as having critical habitat or endangered species.
Archaeological and Historic Preservation Act	16 USC 469	Establishes procedures to provide for preservation of historical and archaeological data which might be destroyed through alteration of terrain as a result of federal construction project for a federal licensed activity or program.	Location	Potential ARAR. OU-7 was used for landfilling activities. No known historic or archaeological value, although no confirmation study has been performed.
Archaeological Resources Protection Act (1979)	93 Stat. 721	Requires a permit for an excavation or removal or archaeological 16 USC 470	Action/Location	Not an ARAR.

Table 2-1 (continued)  
Evaluation of Federal and State ARARs that Might Apply to OU-7,  
Ellsworth Air Force Base, South Dakota

Standard Requirement, Criteria, or Limitation	Citations	Description	ARAR Type	Applicability to OU-7
A. Potentially Applicable or Relevant and Appropriate Federal Standards, Requirements, Criteria, and Limitations				
Executive Order on Floodplains Management	Exec. Order No. 11,988	Requires federal agencies to evaluate the potential effects of actions	Location	Not an ARAR. Area not in 100-year flood plain.
	40 CFR 6.302(a) & Appendix A	they may take in a flood plain to avoid, to the extent possible, the adverse impacts associated with direct and indirect development of a flood plain.		landfill closure.
Executive Order on Protection of Wetlands	Exec. order No.11,990	Requires federal agencies to avoid, to the extent possible, the adverse impacts associate with the destruction or loss of wetlands	Action/Location	Not an ARAR. OU-7 does not have identified wetland areas.
	40 CFR 6.302(a) & Appendix A	and to avoid support of new construction in wetlands if a practicable alternative exists.		
B. Potentially Applicable or Relevant and Appropriate State Standards, Requirements, Criteria, and Limitations				
South Dakota Air Pollution Control Regulations	74:26:01:09, 24, 25, 26-28	Establishes permit requirements for construction, amendment, and operation of air discharge services.	Action	Applicable.
South Dakota Waste Management Regulations	74:26:03:04	Establishes requirements for disposal of hazardous waste in sanitary landfills.	Action	Relevant and appropriate for landfill closure performance guidelines.
South Dakota Waste Management Regulations	74:27:03:11	Defines requirements for closure of solid waste disposal facilities.	Action	Relevant and appropriate for landfill closure performance guidelines.
South Dakota Waste Management Regulations	74:27:09:06	Defines criteria for permit application for other solid waste TSD facilities.	Action	Not an ARAR.
South Dakota Waste Management Regulations	74:27:15	Establishes standards for landfill closure and post-closure monitoring.	Action	Relevant and appropriate.
South Dakota Waste Management Regulations	74:28:24:01	Establishes standard for transporters of waste.	Action	Relevant and appropriate.
South Dakota Water Discharge Permit Rules	74:03:18:01-17	Establishes surface-water discharge permit application requirements.	Action	Applicable for any ground-water treatment discharge
South Dakota Water Discharge Permit Rules	74:03:19:01-08	Establishes surface-water permit conditions.	Action	Applicable for any ground-water treatment discharge
South Dakota Water Discharge Permit Rules	74:03:01	Establishes requirements for individual and small on-site wastewater systems.	Action	Applicable for any ground-water treatment plant.
South Dakota Water Quality Standards	74:03:04:02, 10	Defines use of Boxelder Creek and certain tributaries.	Action	Relevant and appropriate for any ground-water treatment discharge to Boxelder Creek.
South Dakota Remediation Criteria for Petroleum-	74:03:32	Establishes requirements for the remediation of soil contaminated	Chemical	Relevant and appropriate for evaluating acceptable levels of petroleum products in the soil.
South Dakota Ground Water Standards	74:03:15	Defines ground-water classifications by beneficial use and sets	Chemical	Relevant and appropriate in evaluating the beneficial use of impacted ground water.

### 3. LIST OF ACRONYMS AND ABBREVIATIONS

ACC:	Air Combat Command
AF:	Air Force
AFB:	Air Force Base
ARARs:	Applicable or Relevant and Appropriate Requirements
BTEX:	Benzene, toluene, ethylbenzene, and xylene
CAMU:	Corrective action management unit
CERCLA:	Comprehensive Environmental Response, Compensation and Liability Act of 1980
COC:	Contaminants of Concern
CRP:	Community Relations Plan
EAFB:	Ellsworth Air Force Base
EM:	Electromagnetic
EPA:	U.S. Environmental Protection Agency
FFA:	Federal Facilities Agreement
FPTA:	Fire Training Area
GPR:	Ground Penetrating Radar
HI	Hazard Index
HQ:	Headquarters
IRIS:	Integrated Risk Information System
IRP:	Installation Restoration Program
LDR:	Land disposal restriction
LLRWB:	Low-Level Radioactive Waste Burial
MCL:	Maximum Contaminant Level
MCLG:	Maximum Contaminant Level Goal
µg/kg	Micrograms per kilogram
µg/L:	Micrograms per liter
mg/kg	Milligrams per kilogram
mg/L:	Milligrams per liter
MSL:	Mean Sea Level
NCP:	National Oil and Hazardous Substances Contingency Plan
NEPA:	National Environmental Policy Act
NPDES:	National Pollutant Discharge Elimination System
NPDWR:	National Primary Drinking Water Regulations
NPL:	National Priorities List
OMTCS:	Octamethyltetracyclosiloxane
OU:	Operable Unit
O&M:	Operation and maintenance
PAH:	Polynuclear Aromatic Hydrocarbon
pCi/g	Picocuries per gram
pCi/L:	Picocuries per liter
PL:	Public Law
ppm:	Parts per million by weight
RA:	Remedial action
RAB:	Restoration Advisory Board
RAOs:	Remedial action objectives
RCRA:	Resource Conservation and Recovery Act of 1986
RI/FS:	Remedial Investigation/Feasibility Study
ROD:	Record of Decision
SARA:	Superfund Amendments and Reauthorization Act
SDDENR:	South Dakota Department of Environment and Natural Resources
SVOC:	Semivolatile Organic Compound
TCE:	Trichloroethylene
TCL:	Target Compound List
TIC:	Tentatively identified compound
UCL95	95 percent upper confidence limit
USAF:	United States Air Force
UST:	Underground Storage tank
VOC:	Volatile Organic Compound
WSA:	Weapons Storage Area

### APPENDIX A

### FIGURES

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## APPENDIX B

### Responsiveness Summary Remedial Action At Operable Unit Seven Ellsworth Air Force Base, South Dakota

#### 1. Overview

The United States Air Force (USAF) established a public comment period from December 28, 1995 to January 27, 1996 for interested parties to review and comment on remedial alternatives considered and described in the Proposed Plan for Operable Unit 7 (OU-7). The Proposed Plan was prepared by the USAF in cooperation with the U.S. Environmental Protection Agency (USEPA) and the South Dakota Department of Environment and Natural Resources (SDDENR).

The USAF also held a public meeting at 6:30 p.m. on January 11, 1996 at the Douglas Middle School to outline the proposed remedy to reduce risk and control potential hazards at the Operable Unit (OU).

The Responsiveness Summary provides a summary of comments and questions received from the community at the public meeting and during the public comment period as well as the USAF's responses to public comments.

The Responsiveness Summary is organized into the following sections:

- Background on Community Involvement
- Summary of Comments and Questions Received During the Public Comment Period and USAF Responses
- Remaining Concerns

#### 2. Background on Community Involvement

On August 30, 1990 Ellsworth Air Force Base (EAFB) was listed on the USEPA's National Priorities List (NPL). A Federal Facilities Agreement (FFA) was signed in January 1992 by Air Force, USEPA, and the State and went into effect on April 1, 1992. The FFA establishes a procedural framework and schedule for developing, implementing, and monitoring appropriate response actions for EAFB.

Community relations activities that have taken place at EAFB to date include:

- FFA process. After preparation of the FFA by the USAF, USEPA, and SDDENR, the document was published for comment. The FFA became effective April 1, 1992.
- Administrative Record. An Administrative Record for information was established in Building 8203 at EAFB. The Administrative Record contains information used to support USAF decision-making. All the documents in the Administrative Record are available to the public.
- Information repositories. An Administrative Record outline is located at the Rapid City Library (public repository).
- Community Relations plan (CRP). The CRP was prepared and has been accepted by EPA and the State of South Dakota and is currently being carried out. An update to this plan will be prepared in 1996.
- Restoration Advisory Board (RAB). The RAB has been formed to facilitate public input in the cleanup and meets quarterly. In addition to USAF, EPA, and South Dakota oversight personnel, the RAB includes community leaders and local representatives from the surrounding area.
- Mailing list. A mailing list of all interested parties in the community is maintained by EAFB and updated regularly.
- Fact sheet. A fact sheet describing the status of the IRP at EAFB was distributed to the mailing list addressees in 1992.

- Open house. An informational meeting on the status of the IRP and other environmental efforts at EAFB was held on May 6, 1993. An open house was held November 16, 1995 in conjunction with the Restoration Advisory Board meeting. Information on the status of environmental efforts at EAFB was provided.
- Newspaper articles. Articles have been written for the base newspaper regarding IRP activity.

The Proposed Plan for this remedial action was distributed to the mailing list addresses for their comments and additional copies of the Proposed Plan were available at the January 11, 1996 public meeting. A transcript of comments, questions and responses provided during the public meeting was prepared.

### **3. Summary of Comments and Questions Received During the Public Comment Period and USAF Responses**

#### Part I - Summary and Responses to Local Community Concerns

Review of the written transcript of the public meeting did not indicate community objections to the proposed remedial action. No written comments were received during the public comment period.

#### Part II - Comprehensive Responses to Specific Technical, Legal and Miscellaneous Questions

The comments and questions below have been numbered in the order they appear in the written transcript of the January 11, 1996 public meeting.

Comment 1. Jan Deming

Asked if this area will still be used during the cleanup process when USAF is removing soils and if that is going to be a hazard.

Response 1.

USAF will not be removing soils from the Weapons Storage Area as part of the recommended remedial alternative. The selected alternative only includes institutional controls for soils. Therefore, this question is not applicable to the selected remedial alternative.

Comment 2. John Luxem

Asked if USAF is going to take any soil out of the Weapons Storage Area.

Response 2.

See response to comment 1 above.

Comment 3. Phyllis Engleman

Asked if any contaminants will be in the treated effluent from the sanitary wastewater treatment plant.

Response 3.

The selected remedial alternative for ground water does not include recovery of potentially contaminated ground water and treatment at the on-Base sanitary wastewater treatment plant. It only includes institutional controls for ground water. Therefore, this question is not applicable to the selected remedial alternative.

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